

### REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-11, 13-18, and 20-21 are pending in the present application. Claims 22-23 are cancelled without prejudice and Claims 1 and 13 are amended by the present amendment without adding new matter.

In the outstanding Office Action, Claims 1, 13, and 22 were rejected under 35 U.S.C. § 112, first paragraph; Claims 22 and 23 were rejected under 35 U.S.C. § 103(a) as unpatentable over Gravisse et al. (U.S. Patent 4,211,813, herein "Gravisse") in view of Philippe et al. (U.S. Patent No. 6,326,079, herein "Philippe"); Claims 1 and 10 were rejected under 35 U.S.C. § 103(a) as unpatentable over Tamio et al. (JP 08-252305, herein "Tamio") in view of Philippe; Claims 1-9, 11-19, and 21 were rejected under 35 U.S.C. § 103(a) as unpatentable over Murasawa et al. (U.S. Patent No. 5,547,823, herein "Murasawa") in view of Philippe; and Claim 20 was rejected under 35 U.S.C. § 103(a) as unpatentable over Murasawa in view of Philippe and in further view of Oosawa (Japanese Patent Application JP 08-269391).

Because the present amendment reduces the issues for appeal by canceling Claims 22 and 23, entry of this amendment is respectfully requested.

Regarding the rejection of Claims 1, 13, and 22 under 35 U.S.C. § 112, first paragraph, Applicants respectfully submit the features rejected by the outstanding Office Action at page 3, first full paragraph, find support in the specification. More specifically, the specification discloses at page 10, lines 16-21, that a preferred thickness of a coating "takes into account the most commonly encountered mean size of the anatase TiO<sub>2</sub> crystallites." Further, the specification discloses (i) at page 14, lines 11-12, that "a mean size [of the TiO<sub>2</sub> crystallites is] of the order of 20 to 80 nm," (ii) at page 14, lines 35-36, "anatase crystallized

TiO<sub>2</sub> particles with a mean diameter of 30 nm,” and (iii) at page 15, lines 23-24, “TiO<sub>2</sub> particles [that] have a mean diameter of approximately 45 nm.” Thus, the specification teaches (i) the thickness of the coating depends on the mean size of the anatase TiO<sub>2</sub> crystallites, and (ii) the size of the crystallites is between 20 and 80 nm. Therefore, Applicants respectfully submit that the claimed thickness of a photocatalytic coating material between 30 and 50 nm being comparable to a mean size of crystallites of the at least partially crystallized titanium oxide, as recited in amended Claims 1 and 13, is supported by the specification. Accordingly, it is respectfully requested this rejection be withdrawn.

Claims 22 and 23 were rejected under 35 U.S.C. § 103(a) as unpatentable over Gravisse in view of Philippe. That rejection is moot because Claims 22-23 have been cancelled.

Claims 1 and 10 were rejected under 35 U.S.C. § 103(a) as unpatentable over Tamio in view of Philippe. That rejection is respectfully traversed.

Independent Claim 1 has been amended to more clearly recite that an adhesion promoter promotes an adhesion of a photocatalytic semi-conducting material to a fibrous material.

Briefly recapitulating, independent Claim 1 is directed to a substrate including a fibrous material and a photocatalytic coating material. The photocatalytic coating material coats at least a portion of the fibrous material and includes a photocatalytic semi-conducting material and an adhesion promoter for promoting adhesion of the photocatalytic semi-conducting material to the fibrous material. The photocatalytic semi-conducting material includes titanium oxide, which is at least partly crystallized in anatase form, and the photocatalytic coating material coats fibers in the portion of the fibrous material over a thickness between 30 and 50 nm, which is comparable to a mean size of crystallites of the at least partly crystallized titanium oxide in anatase form.

Turning to the applied art, Tamio shows in Figure 1 a single glass fiber 11 coated with polytetrafluoroethylene (PTFE) fine particles 13 and separated photocatalysts fine particles 14 “held in the clearance between the PTFE fine particles 13.”<sup>1</sup> However, Tamio does not teach or suggest that a photocatalytic coating material coats fibers over a thickness of between 30 and 50 nm, as recited in Claim 1.

The outstanding Office Action relies on Philippe for teaching coating a substrate with titanium oxide. Philippe teaches that the substrate is glass, ceramic or vitroc ceramic<sup>2</sup> and Philippe coats an entire surface of that solid substrate with titanium oxide. Also, Philippe is silent about an adhesion promoter of the photocatalytic coating material. In fact, Philippe does not need an adhesion promoter because Philippe uses a solid substrate, which holds the coating material better than a fibrous material. Thus, Philippe does not teach or suggest coating fibers of a fibrous material with a photocatalytic coating material that includes (i) a photocatalytic semi-conducting material, and (ii) an adhesion promoter.

Therefore, Applicants respectfully submit the outstanding Office Action has not established a proper basis for the rejection based on Tamio and Philippe.

As stated in MPEP §2142:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

The outstanding rejection, particularly with respect to the claim features directed to “the photocatalytic coating material [that] coats fibers ... over a thickness of between 30 and

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<sup>1</sup> Tamio, Abstract.

<sup>2</sup> Philippe, column 1, lines 50-56.

50 nm, which is comparable to a mean size of crystallites of the at least partly crystallized titanium oxide in anatase form” does not meet at least the first basic criterion noted above.

Applicants respectfully submit that one of ordinary skill in the art would not combine the teachings of Tamio with the teachings of Philippe because Tamio teaches interspacing individual photocatalytic fine particles in PTFE spaces around a fiber while Philippe teaches a continuous coating to form a solid material without an adhesion promoter. These disparate reference teachings further raise a question of why the artisan would even consider these references for combination, a question the PTO must answer. See *In re Lee*, 61 USPQ2d 1430, 1434 (Fed. Cir. 2002), requiring the PTO to “explain the reasons one of ordinary skill in the art would have been motivated to select the references ....”

In addition, there is no motivation or suggestion to coat the fiber of Tamio with a photocatalytic coating material having a thickness between 30 to 50 nm. Philippe specifically teaches, at column 13, lines 43-47, that “a TiO<sub>2</sub> coating with a thickness greater than the mean size of the monocrystals or ‘crystallites’” produces a better photocatalytic effect. Thus, one of ordinary skill in the art would be motivated to use a coating having a thickness greater than the mean size of the crystallites for TiO<sub>2</sub>, based on the teachings of Philippe.

Accordingly, it is respectfully submitted that independent Claim 1 and dependent Claim 10 patentably distinguish over Tamio and Philippe, either alone or in any proper combination.

Claims 1-9, 11-19, and 21 were rejected under 35 U.S.C. § 103(a) as unpatentable over Murasawa in view of Philippe. That rejection is respectfully traversed.

Independent Claim 14 has been amended similar to independent Claim 1.

Murasawa discloses a photocatalyst composite having a substrate with particles of a photocatalyst adhered to the substrate via “a less degradative adhesive.”<sup>3</sup> Murasawa specifically discloses at column 4, lines 59-64, that the substrates to be used “in the present invention include inorganic articles such as ceramics and glasses, organic articles such as plastics, elastomers, woods and paper sheets, and metallic articles made of a metal such as aluminum or an alloy such as steel.”

Thus, Murasawa teaches coating an entire surface of a solid substrate and is not concerned with coating in a manner to coat individual fibers of a fibrous material. Thus, even though Murasawa could coat paper sheets, Murasawa does not teach or suggest applying the coating to individual fibers of the paper sheets as required in independent Claims 1 and 14.

In addition, Murasawa does not teach or suggest (i) TiO<sub>2</sub> partially crystallized in anatase form, and (2) a thickness of a photocatalytic coating material is between 30 and 50 nm, which is comparable to a mean size of crystallites TiO<sub>2</sub>. Applicants note that the outstanding Office Action states at page 6, third full paragraph, that Murasawa discloses in Claim 4 TiO<sub>2</sub> partially crystallized in anatase form. However, Applicants respectfully submit that in *In re Benno*, 226 USPQ 683, 686 (Fed. Cir. 1985), the court specifically stated “[t]he scope of a patent's claims determines what infringes the patent; it is no measure of what it discloses.” Thus, it is respectfully submitted that the claims of an applied patent cannot be used as teaching or disclosing features simply because they are broad in scope. Moreover, even with its broad scope, Claim 4 of Murasawa does not specify the claimed thickness.

The outstanding Office Action relies on Philippe for teaching the features lacking in Murasawa. However, as discussed above regarding combining Tamio and Philippe, one of ordinary skill in the art would not find any motivation or suggestion in the record to substitute the solid substrate of Philippe with a paper sheet of Murasawa, or to cover the individual

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<sup>3</sup> Murasawa, Abstract.

fibers of the paper sheets of Murasawa with a coating material having a thickness between 30 and 50 nm.

Accordingly, it is respectfully submitted independent Claims 1 and 14 and each of the claims depending therefrom patentably distinguish over Murasawa and Philippe, either alone or in combination.

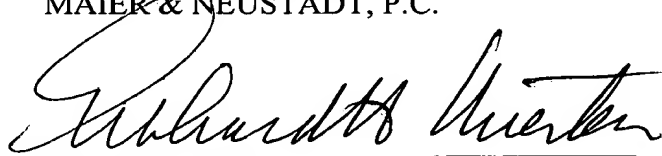
Claim 20 was rejected under 35 U.S.C. § 103(a) as unpatentable over Murasawa, Philippe, and Oosawa. That rejection is respectfully traversed.

The outstanding Office Action relies on Oosawa for teaching a coating composition including an organic metallic complex. However, Oosawa does not overcome the deficiencies of Murasawa and Philippe discussed above. In addition, Claim 20 depends from independent Claim 1, which is believed to be allowable as noted above. Accordingly, it is respectfully submitted that dependent Claim 20 is also allowable.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that affect is respectfully requested.

Respectfully submitted,

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